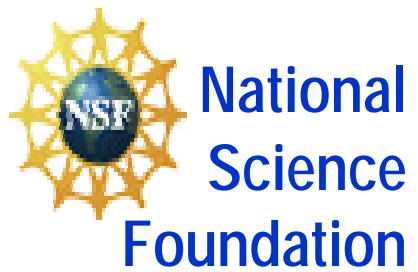


Large Scale Real-Time Embedded Systems



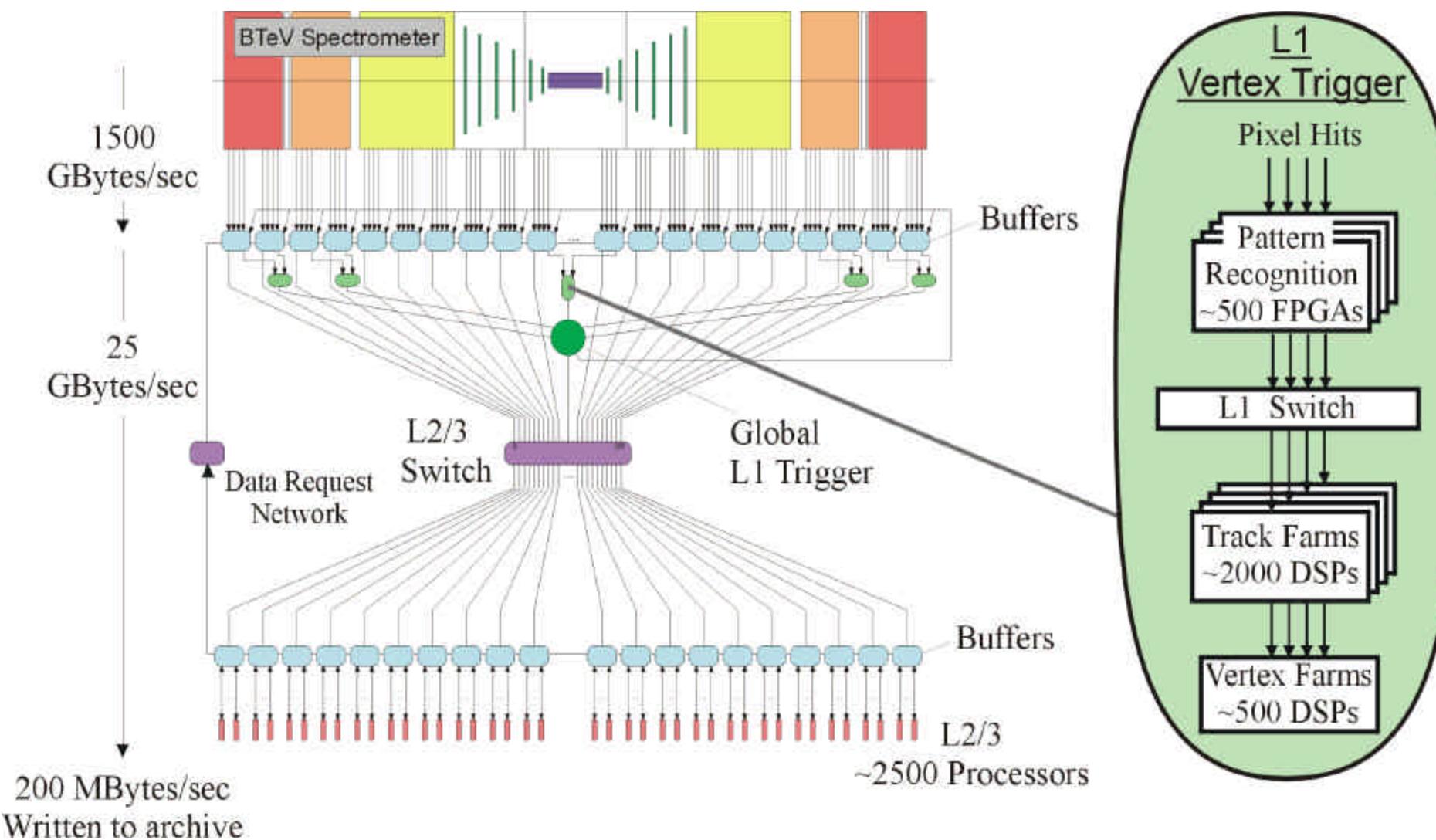
Collaboration

-  ➤ University of Illinois
-  ➤ Vanderbilt University
-  ➤ Syracuse University
-  ➤ University of Pittsburgh
-  ➤ Fermi National Accelerator Laboratory

Designing and implementing very large-scale real-time embedded computer systems

- Ultra high computational performance through use of parallel hardware architectures
- Functional integrity via distributed, hierarchical monitoring and control;
- Highly available, dynamically reconfigurable, maintainable, and evolvable architecture

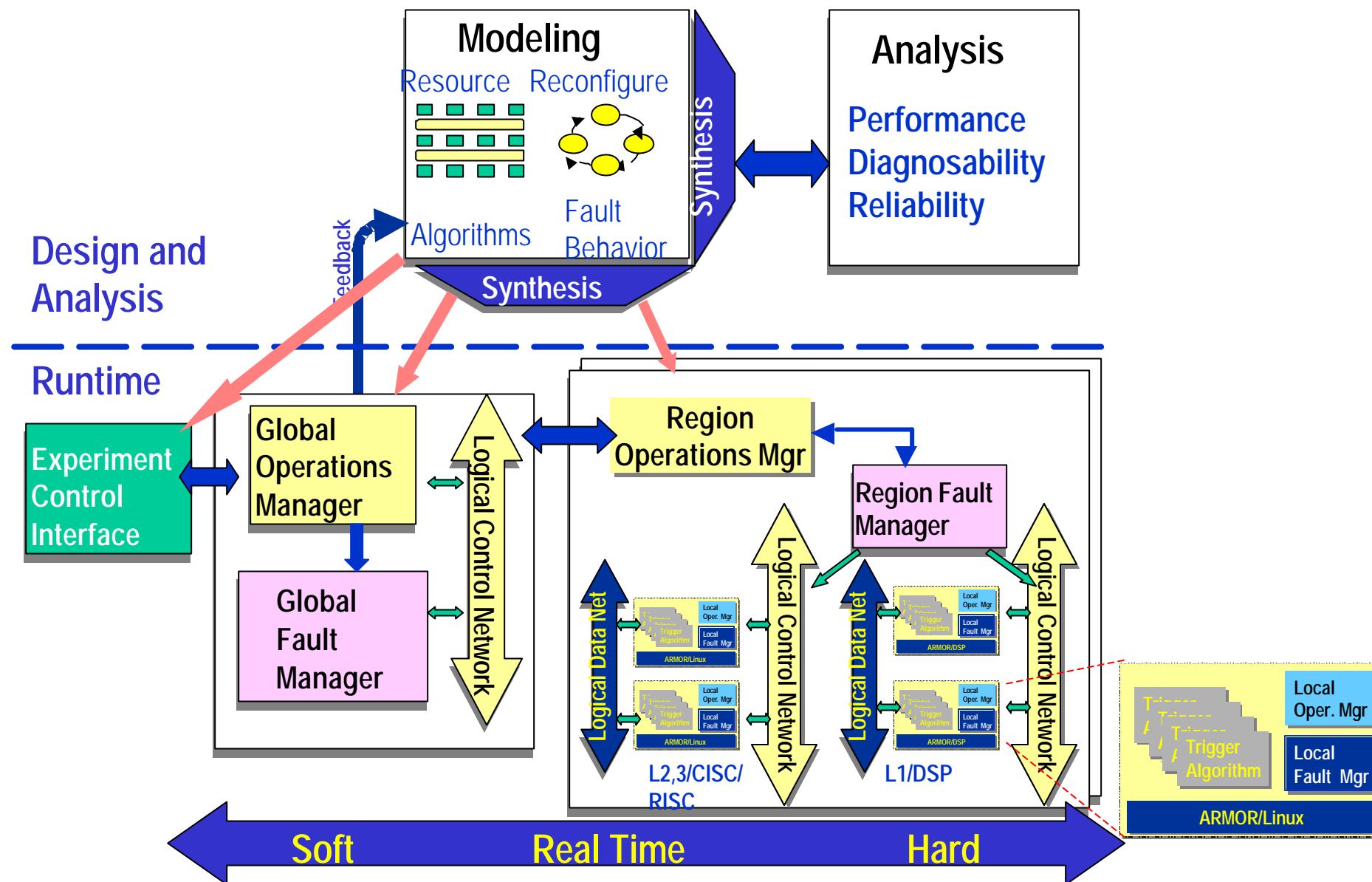
Application Trigger and Data Acquisition System



The Problem

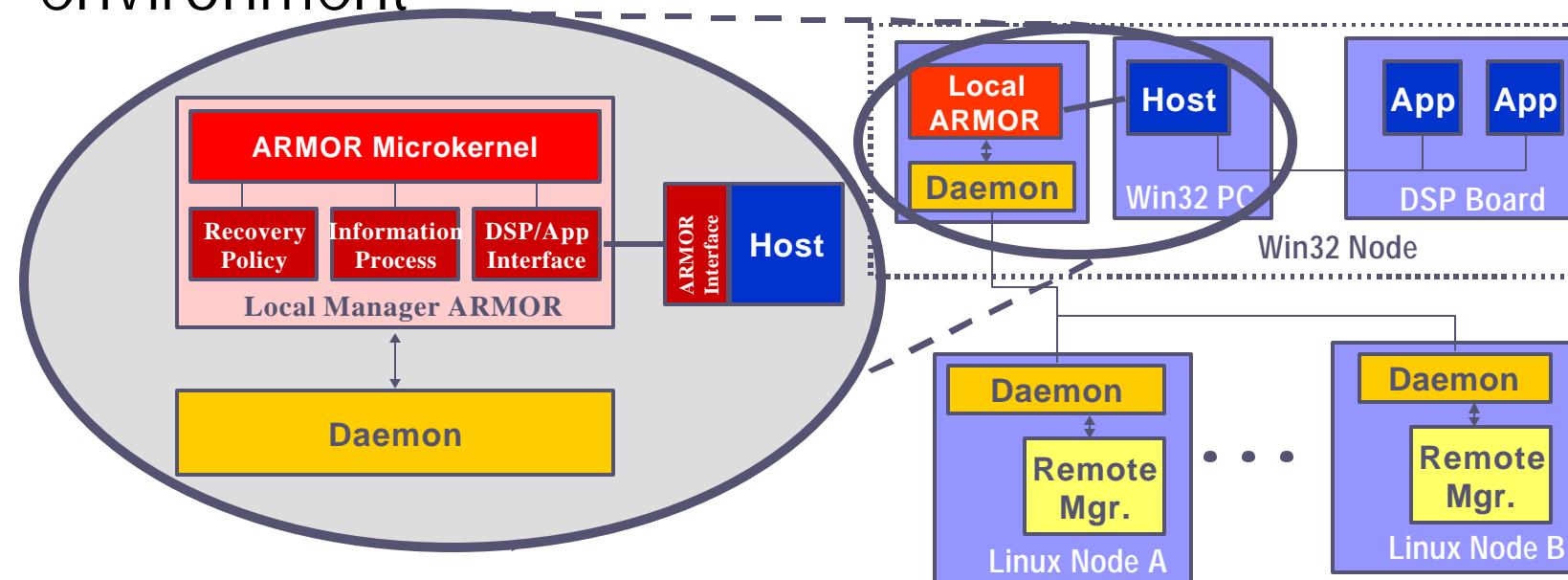
- Large system
 - 100's (1000's) of FPGAs in the muon (pixel) trigger
 - 250+ (2500+) DSPs
 - 2500+ processor Linux farm
- Something will fail !
- How do we get the best/most physics?
 - Detection, mitigation, graceful degradation

RTES Solution



ARMOR-based Hierarchical Error Management

- Multithreaded processes composed of replaceable building blocks (elements)
- Provide error detection and recovery to applications
- Hierarchy of ARMORs forms self-checking runtime environment



Current Testbed

